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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,042	02/14/2001	Akira Yamaguchi	Q62085	8214

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SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
WASHINGTON, DC 20037-3213

EXAMINER

TON, MINH TOAN T

ART UNIT PAPER NUMBER

2871

DATE MAILED: 05/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/782,042

Applicant(s)

YAMAGUCHI, AKIRA

Examiner

Toan Ton

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 12-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-11 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6,9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Election/Restriction

An election of species I (claims 1-11) is acknowledged. Species I (claims 1-11) corresponds to Figures 1-6B having the particular shapes of the micro lenses and the light entrance areas. Species II (claims 12-17) corresponds to Figures 7-9 having the particular shapes of the micro lenses and the light entrance areas. Species III (claims 18-23) corresponds to the particular surface details, which is different from the particular surface details of the species, I. Thus, these are patentably distinct species from each other.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishihara (US 5946100).

Ishihara discloses a collimating plate (see Figures 6-7) comprising:

a lens (glass) substrate;

a plurality of micro lenses disposed on a surface of the lens substrate;

a plurality of light entrance areas (see ‘pinholes’ of Figures 6-7) each having a circular form a center of which is on an optical axis of each of the plurality of micro lenses and set on another surface of the lens substrate reverse to the plurality of micro lenses ;

and light shield films formed on another surface of said lens substrate reverse to the

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plurality of micro lenses so as to cover other area than the plurality of light entrance areas,

wherein when a refractive index of the lens substrate is represented by n ; a thickness of the lens substrate by t ; a diameter of each of the plurality of light entrance areas by R ; and a size of each of the plurality of micro lenses by S_r , the following formula : $S_r \geq 2t \times \tan\theta + R$ (with the proviso that $\theta = \sin^{-1}(1/n)$) is satisfied) [see attached sheet for this derived formula].

Per claim 3, see Figure 7.

Per claim 4, glass has a refractive index of 1.4-2.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara as applied to claims 1, 3-4 above.

The use of a diffusing-reflecting means is known and common in the art for achieving advantages such as high efficiency of light. Therefore, it would have been obvious to one of ordinary skill in the art to employ a diffusing-reflecting layer, as it is common and known in the art for achieving advantages such as light uniformity.

5. Claims 5-6, 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Disclosed Art (APA hereinafter, background of the invention) in view of Ishihara (US 5946100), as applied to claims 1-4 above.

APA discloses that the use of a liquid crystal display device yields several advantages such as size reduction, small thickness, light weight. APA discloses a conventional liquid crystal display device employing the use of a conventional collimating plate, wherein there are several problems (e.g., low efficiency of light) of the conventional collimating plate.

Ishihara discloses a collimating plate comprising: a lens (glass) substrate; a plurality of micro lenses disposed on a surface of the lens substrate; a plurality of light entrance areas (see 'pinholes' of Figures 6-7) each having a circular form a center of which is on an optical axis of each of the plurality of micro lenses and set on another surface of the lens substrate reverse to the plurality of micro lenses ; and light shield films formed on another surface of said lens substrate reverse to the plurality of micro lenses so as to cover other area than the plurality of light entrance areas, wherein when a refractive index of the lens substrate is represented by n ; a thickness of the lens substrate by t ; a diameter of each of the plurality of light entrance areas by R ; and a size of each of the plurality of micro lenses by S_r , the following formula : $S_r \geq 2t \times \tan\theta + R$ (with the proviso that $\theta = \sin^{-1}(1/n)$ is satisfied) [see attached sheet for this derived formula]. Ishihara discloses that such collimating plate yields advantages such as improved array confocal imaging. Therefore, it would have been obvious to one of ordinary skill in the art to employ the collimating plate as disclosed/taught by Ishihara for achieving advantages such as improved array confocal imaging.

The use of a plurality of light sources is known in the art for achieving advantages such as light uniformity, and commonly-used in the projecting type display device, wherein light sources such as LEDs, organic EL elements are common and known light-source elements. Therefore, it would have been obvious to one of ordinary skill in the art to employ a plurality light sources for achieving advantages such as light uniformity, as it is known and commonly-used in the projecting type display device.

Allowable Subject Matter

6. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not anticipate nor render obvious to one ordinary skilled in the art a lighting device comprising a combination of various elements as claimed, more specifically, wherein a light emission size of each of the plurality of light sources is smaller than a size of each of the plurality of light entrance areas.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Contact Information

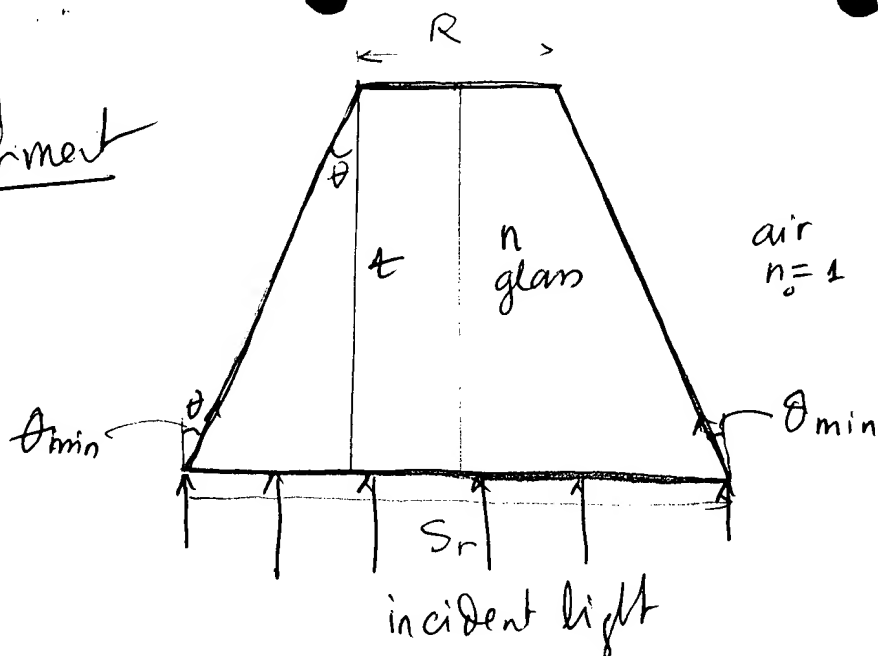
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan Ton whose telephone number is (703) 305-3489. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

May 14, 2003



TOANTON
PRIMARY EXAMINER

Attachment



$$1) n \sin \theta_{\text{glass}} = n_0 \sin \theta_{\text{air}}$$

$$\text{if } \theta_{\text{air}} = 90^\circ \quad \theta_{\text{glass}} = \theta_{\min}$$

$$n \sin \theta_{\min} = n_0 \sin 90^\circ = 1 \cdot 1 = 1$$

$$\theta_{\min} = \sin^{-1} (1/n)$$

$$(2) \frac{(S_r - R)/2}{t} = \tan \theta_{\min}$$

$$S_r - R = 2t \cdot \tan \theta_{\min}$$

$$S_r - R \geq 2t \cdot \tan \theta \quad (\theta \geq \theta_{\min})$$

$$S_r \geq 2t \cdot \tan \theta + R$$